REMARKS

The Office Action of March 27, 2003 rejected claims 1-20 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,566,259 (Pan) in view of JP 11-174382 (Shin). By this amendment, claims 1-2, 5-6, 9, 12, 15, 18, and 20 are currently amended. New claim 21 has been added. Claims 1-21 are pending.

Claim 1 as amended is directed to a dual-stage optical isolator that includes two stages. The first stage includes a first wedge and a second wedge while the second stage includes a third wedge and a fourth wedge, which are counterparts to the first wedge and the second wedge. The claim requires that the second stage be mechanically rotated with respect to the first stage by 90 degrees. At the same time, the claim requires that the first wedge, the second wedge, and the third wedge each have a different optical axis. Because the optical axes of the first, second, and third wedges are different, the first stage is optically different from the second stage.

The specification of the present invention, in fact, states that "the two cores are not identical." *See* page 7, lines 13-14. This is illustrated in Figure 2. In Figure 2, the second stage 302 is mechanically rotated 90 degrees from the first stage 200. However, the first wedge 204 of the first stage 200 and its counterpart wedge 304 of the second stage 302 have different optical axes. In Figure 2, for example, the optical axis of the first wedge is 45 degrees and the optical axis of the second wedge is 90 degrees. The optical axis of the first wedge is also different from the optical axis of the third wedge, which is 0 degrees. Claim 1 requires that the first optical axis be different from both the second wedge and the third wedge. Claim 1 has been amended to more clearly require that the second stage be mechanically rotated with respect to the first stage and that the first, second, and third wedge each have a different optical axis.

As noted in the specification of the present invention, fabricating dual-stage isolators using 22.5 degree wedges is difficult because the wedges have to be aligned at angles of 45 degrees relative to each other. *See* page 2, lines 11-14. This type of arrangement using 22.5 degree wedges is taught by Pan. As illustrated in Figure 3A of Pan, "the optical axis of the first polarizer 12A of lithium niobate is 22.5 degrees . . . ." *See* col. 5, lines 58-59. As further illustrated in Figure 3A, the optical axis of the polarizer 14A is rotated 45 degrees with respect to the polarizer 12A. Thus, the optical isolator stages taught by Pan are difficult to fabricate as the wedges are 22.5 degree wedges that are aligned at angles of 45 degrees relative to each other in each stage. Rotating 22.5 degree wedges as taught by Pan is distinct from using wedges that have different optical axes as required by claim 1.

Thus, Pan teaches an optical isolator where each of the wedges is a 22.5 degree wedge. Because each of the wedges in Pan has the same optical axis, the wedges are aligned at 45 degrees relative to each other. As previously indicated, this type of alignment can be difficult. One consequence of using wedges that have the same optical axes is that the first and second stage taught by Pan are not optically different as required by claim 1. In other words, each of the wedges in the first stage of Pan are the same as the wedges in the second stage of Pan whereas claim 1 requires different wedges in each stage. Pan further illustrates the two isolator stages in a non-rotated position and does not discuss the relative mechanical position of the two stages. *See* Figures 2A, 2B, 3A-3D. For at least these reasons, Pan does not teach or suggest claim 1 as amended, which requires wedges having different optical axes.

The Examiner cites Shin to suggest that it is obvious to rotate a second stage by 90 degrees with respect to a first stage. Shin does not teach or suggest, based on a review of the abstract and the Figures, an optical rotation that is different from the mechanical rotation or the

use of wedges that have different optical axes. In fact, Figure 1 displays, in addition to the two isolator stages, a single coordinate system that appears to apply to each wedge illustrated in each stage of the isolator shown in Figure 1. As a result, it is presumed that each wedge has the same optical axis. *See* Figure 1 of Shin. The abstract of Shin teaches that after the isolators 1 and 2 are assembled on a concave arc jig 3, the polarized wave dispersion is measured and the isolators are fixed at a position at which polarized wave dispersion is minimum.

For at least these reasons, the combination of Pan in view of Shin does not teach or suggest claim 1, which requires that some of the wedges in the two stages have different optical axes. Claim 1 is therefore believed to be in condition for allowance. Claims 6 and 15 have been similarly amended to require a first wedge and a second wedge that have different optical axes and are also believed to be in condition for allowance. Claims 2-5, 7-14, and 16-20 are dependent claims and are in condition for allowance for at least this reason. For at least the same reasons, new claim 21 is also in condition for allowance.

Claims 1-21 are thus pending and favorable action is requested. In the event of any question, the Examiner is respectfully requested to initiate a telephone conversation with the undersigned.

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Respectfully submitted,

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